

Results of the Harvard-Adelaide Universities
Anthropological Expedition, 1938-1939
The Racial Origin of the Extinct Tasmanians⁽¹⁾

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This paper is concerned with the problem of the origin and the ultimate racial affiliations of the extinct Tasmanians, rather than with the well-established uniqueness of this insular population. The issue will be viewed with a genetic orientation in so far as materials allow, instead of from a purely descriptive or anatomical point of view. No attempt will be made to refer to the work of all the authorities who have been concerned with this subject.

Historically, the Tasmanians and the problem of their origin have occupied the minds of anthropologists to a degree perhaps disproportionate to their ultimate importance. A number of the earlier theories of origin have been discarded because of their naivety in the light of now existing data. The view that the Tasmanians were autochthonous on that island was rejected as anthropological theory gained in sophistication. The belief, once held, that these aborigines reached Tasmania by a migration via Antarctica, is no longer seriously maintained. Meston (1937) has dispatched the theory, first put forward by Huxley (1870), and later vigorously championed by Wood Jones (1934), that the Tasmanians reached their domain directly by an overseas migration from New Caledonia or some other island in Melanesia. This last view was merely a by-product of the once stoutly defended idea that the Australian aborigines represented an unmixed and homogeneous racial group. There is now overwhelming evidence to the contrary (Birdsell, 1941).

Finally, there remained the now generally accepted theory that the Tasmanians are in some degree related to the Asiatic Negritos and reached the island across Bass Strait after traversing the Australian mainland. While the passage of time and the acquisition of new data have thus narrowed the major theories concerning the origin of the Tasmanians to a single one, this is expressed in several forms which differ in implication.

Turner considered that the Tasmanians reached that island prior to its post-Pleistocene separation from Australia. In his earlier work (Turner, 1908), he commented on the low values of the cranial height-breadth index found among series from South and Western Australia, and suggested that this trait indicated the racial affiliation of these groups with the Tasmanians. It is clear, however, from his later writings (Turner, 1910) that he considered the Australians to be the mixed population, and the Tasmanians a pure race. He believed the latter to be representatives of the Oceanic Negritic race, and concluded that any differ-

⁽¹⁾ This and the two following papers were among those read at the symposium on the extinct Tasmanians, organised by Section F, Anthropology, at the Hobart meeting of the Australian and New Zealand Association for the Advancement of Science in January, 1949.

ences between these two groups were to be attributed to the insular position of the Tasmanians and the operation of evolutionary processes on that island during the post-Pleistocene period.

Wunderly's conceptual framework (1935, 1938*a*, 1938*b*, 1938*c*, 1939, and 1943) clearly stemmed from Turner. He reached conclusions which in their broad essence are hardly distinguishable from those first expressed by the latter authority. Both of these anthropologists considered the Tasmanians to be exclusively negritic in origin, although they recognised some differences between the two populations. These they presumed to be due to forces loosely labelled as evolutionary in nature.

Hrdlicka and Hooton both presented a somewhat different analysis of the racial composition of the Tasmanians. Hrdlicka was far from clear in his published views (1928, p. 90), but he firmly maintained that the Tasmanians and the Australians represented closely related races and that the latter probably represented '*a mere local variant of the Australian*'. He did not equate the Tasmanians with the Negritos. It is but fair to point out that he concerned himself primarily with cranial data and seemed to ignore the available evidence based upon the living Tasmanians. Hooton (1931) was much more specific and described the Tasmanians as a hybrid race rather than a pure one. He considered that the predominant element was Oceanic Negrito and that the minority ingredient was Archaic White of the type found in a less mixed form among the aborigines of south-eastern Australia. Thus, these two authorities differed markedly in their conclusions from Turner and Wunderly.

The hypotheses to be presented below are based upon the metrical and morphological analysis of data collected in the field by N. B. Tindale and the author during the years 1938 and 1939, as members of the Harvard-Adelaide Universities Anthropological Expedition. These data represent 2,458 individuals consisting of full-blooded Australian aborigines, hybrid Australian aborigines, and the majority of the Tasmanian hybrids then resident on Cape Barren Island. Additional materials include 125 Australian crania measured in the South Australian Museum and small series of Tasmanian and Andamanese crania examined in various institutions. The detailed analysis of these materials, which demonstrate the trihybrid origin of the Australian aborigines with a high degree of statistical significance, will be published as a series of monographs in the Papers of the Peabody Museum, Harvard University. A preliminary report on the negritic tribes appeared in the Records of the South Australian Museum in 1941.

The importance of the data on the full-blooded Australian aborigines lies in the fact that, for the first time, it is scientifically possible to demonstrate the presence of three major racial groups on the Australian mainland, and to determine their racial affiliations with other peoples on the continental land masses of the Old World. One of these types, of negritic origin, is of special pertinence in the analysis of the origin of the extinct Tasmanians. It is fitting that the discovery of this hitherto physically undescribed (Birdsell, 1940; Tindale and Birdsell, 1941) bloc of tribes in the rain-forested hinterland of Cairns, Queensland, should be due to the scientific acumen of my companion in this field work, Norman B. Tindale, ethnologist, who represented the University of Adelaide and the South Australian Museum in this joint project. It is an ironic fact that evidence for the presence of a negritoid people on the mainland of Australia has been available since Atkinson first photographed these tribes in about 1890. During the intervening half century these important plates have gone unnoticed and unappreciated in many museums throughout the world. Tindale, who steadfastly refused to be overwhelmed by the conclusions of Wood Jones (1934), Campbell, Gray and Hackett (1936), Howells (1937) and others, that the Australians represented a single

homogeneous race, seems to have been alone in appreciating the importance of the problem posed by Atkinson's photographs. The author's data completely confirm Tindale's position in this matter.

The analysis of the origins of the extinct Tasmanians cannot be posed as an isolated and independent problem. The answer lies across Bass Strait in Australia, and even further afield in Melanesia, Indonesia and the whole of continental Eurasia. The factors to be considered include the obvious one of race and, in addition, the more subtle variables of climate, ecology and eustatic changes in sea level. In these broader terms let us hypothesize the early movements of peoples out of Asia, across Wallace's Line into New Guinea, Australia and finally Tasmania.

Four anthropologists, Fenner (1939*b*), Hrdlicka (1928), Morant (1927) and Wagner (1937), each working with craniological materials and techniques, have noted and published indications of appreciable differences between the aborigines of southern Australia and those of the Northern Territory. In addition, Fenner, Hrdlicka and Wagner have commented upon the apparent uniqueness of the crania from Queensland. Their materials from Queensland were derived from the entire coastal districts and did not represent a localized sample from the Cairns rain-forest area. Owing to the nature of their data, the racial implications of these differences cannot be said to have been firmly established in terms of population origins and affinities. Hrdlicka (1928), in noticing these regional differences, considered them merely to represent local variations of a basic type.

Due to the great advantage inherent in working with living peoples as opposed to crania, the author has been able to isolate and describe three major racial elements in the aboriginal population of Australia. The Oceanic Negritos are the earliest of these migrant groups and are represented as an important element in the Barrineans, who have been named after Lake Barrine. This lake is located on the Atherton Tableland, near the centre of distribution of these rain-forest tribes. The data for the twelve nuclear Barrinean tribes consists of 95 adult males and a somewhat smaller series of females. The negritic element has not been previously isolated in a decisive way as an important factor in the Australian aboriginal population. It does not equate with the Queensland cranial types of the above-mentioned craniologists. The second racial element in Australia has been named the Murrayian. It corresponds in a general way with the Type A or Southern type of the four previously mentioned workers. This type is here identified with the Caucasoid race of which it represents a primitive variant. The third and final racial element in Australia is called the Carpentarian, from its nuclear position around that Gulf. It is to be identified as the Type B or Northern Territory type of Fenner and others. The Carpentarians represent a fourth and previously unidentified major racial group with status equivalent to the Negroid, Mongoloid and Caucasoid races. These three racial elements will be discussed below in greater detail and in the order of their appearance in Australasia.

The Oceanic Negritos represent the earliest identifiable migrants to Australia. Their spread to this region may be tentatively dated in terms of the Asiatic chronology as early in the Fourth or Last Glacial Period. This racial element is recognizably present in Australia, in both the extinct Tasmanians and in the Barrinean tribes in coastal north-eastern Queensland. In other marginal areas, such as south-eastern Australia, the *cul-de-sac* of the extreme south-west and Melville and Bathurst Islands, there are more attenuated traces of the negritic substratum. The total evidence for dating this migration is non-archaeological, and rests upon the patterning of the marginal distribution of the genetic marker-

traits. There can be little doubt that Oceanic Negritos in relatively unmixed form did represent the first wave of human immigration into Australia, if it is assumed that *Homo soloensis* did not migrate beyond Wallace's Line.

The living Andamanese represent the least mixed of the existing Oceanic Negritos and may be taken as models of the type. This population is characterized by very short stature, dark skin colour, hair form ranging from true pepper-corn to so-called woolly, moderate round-headedness, low nasal relief and a very short and narrow face. The general impression is that of an infantile type. In terms of total morphology, there is every reason to believe that the African Negrillos and the Oceanic Negritos in earlier times represented a common population, and hence a single gene pool, which must have originated in the rain-forests of Central Africa.

Before describing in a general way the physical characteristics of the Barrinean tribes, it should be noted that various writers have commented upon the occurrence of "frizzly" hair among some of the natives of coastal north Queensland. Lumholtz, as early as 1889, explains this aberrant hair form as having its origin in Melanesian contacts. Such contacts have been postulated in two differing contexts. The first of these represents a cultural and genetical penetration in late prehistoric times from the Torres Strait islands down Cape York Peninsula. The second possible source of Melanesian hybridization resulted from the historic importation of labourers from various islands to work the sugar cane fields of the Cairns region. The degree of this penetration in the former instance can be determined by the presence of blood group B which is found throughout northern Cape York Peninsula as far south as the Tjapukai tribe, west of Cairns, which represents the most northerly of the twelve Barrinean tribes. Thus the nuclear and southern area of the Barrinean peoples can be shown to be genetically unaffected by Papuan influences emanating from the Torres Strait region. The possible effects of the imported Melanesian labourers as a hybridizing agency in historical times has been removed from our data by means of Tindale's genealogical studies. The few F-1 and F-2 generation Melanesian-Australian hybrids found in this area were easily detected and eliminated from the series. The Barrineans owe their unique traits to an ancient negritic substratum, and not to late prehistoric Papuan or historic Melanesian hybridization.

It is of some interest to compare in a general way the physical characteristics of the extinct Tasmanians and the Barrineans respectively with the Andamanese. In three basic traits the Tasmanians stand closer to the Andamanese than do the rain-forest tribes of Queensland. While the Barrineans show a more extreme development of the parietal bosses than do the Australian aborigines in other regions, the development of this trait is both less common and less extreme than apparently occurred among the Tasmanians and the Andamanese. Secondly, cranial breadth among the Tasmanians is appreciably greater than among the Barrineans, and hence the latter show lower length-breadth indices and higher height-breadth indices than do the Tasmanians or the Andamanese. While great importance has been placed upon these two indices in terms of the classic approach of physical anthropologists to race, there are new data, as yet unpublished, which suggest that in small breeding populations, such as those which occurred throughout Australia and Tasmania, as well as the Andaman Islands, the values of these indices may be markedly affected by the phenomenon known as random genetic drift. Under such conditions these traits are perhaps less important as markers of racial relationship than anthropologists have concluded in the past. The third trait in which the Tasmanians more nearly approximate the Andamanese is hair form. The former have tightly helically curled hair as a general, and surprisingly

uniform, characteristic. The Tasmanian hair was more open in its spiral curl and reached a greater terminal length than the Andamanese hair, and it obviously represents a hybridized version of the latter. Hair of this nature is common among the Barrineans, but in general their hair is still further removed from the true negritic condition.

The Tasmanians and the Barrineans deviate about equally from the Andamanese in several other traits. Both of the former groups show very marked nasion depressions. This trait is only slightly developed in the Andamanese. Data in the author's possession strongly suggest that the deep nasion depression which has been considered a racial characteristic of the Tasmanians and the equally deep one found among the Barrineans, must be considered a legacy due to the hybridization of the Oceanic Negritic strain with the Murrayian type of south-eastern Australia. Secondly, the Barrineans and Tasmanians both show less baldness than do the Murrayian Australians, and in so far as the scanty evidence for the Tasmanian population allows a conclusion to be drawn, both groups seem to deviate in about an equal degree toward the Andamanese in this trait.

The Barrinean tribes are closer to the Andamanese than are the Tasmanians in the following significant list of physical characteristics. The data clearly show that the Barrineans more closely approximate the reduced stature of the Andamanese than do the Tasmanians and, by inference, likewise in weight. There is present among these rain-forest tribes of Australians a genetic tendency for the bleaching of the tips of the hair of the head to a bright foxy red colour. This is characteristic of negritic peoples throughout their distribution. As yet I have found no account of this trait for the Tasmanians. The Barrineans more closely approximate the glabrous condition of the Andamanese, and show less development of the beard than may be attributed to the Tasmanians. Whereas the ear form of the Tasmanians tended to approximate the great over-all size and large lobe found in the Murrayians, among the Barrineans the ear form is small and classically negritoid. The Barrinean nose is characteristically low in relief and approximates the Andamanese type more closely than did that of the Tasmanians. Whereas most Tasmanian crania reveal well-developed muscular attachments and a general rugosity approaching that of the southern Australians, the crania from the Queensland rain-forests are notable for their slight muscular relief and their general gracility. In this and in many other features, the Barrineans recall the infantile morphology of the Andamanese. The facial characteristics of the Barrineans deviate from the Tasmanians further in the direction of the Andamanese in the following characteristics: the face is absolutely shorter, and both absolutely and relatively much narrower; bigonial diameter is much reduced; both the brow ridges and glabella are less developed and forehead slope is so diminished that a minority of individuals show a bulging, infantile contour in this region. In their dental traits the Barrineans again stand in closer relationship with the Andamanese than do the Tasmanians. General tooth size is smaller and there is a notable tendency toward a reduction in the number of molar cusps in the lower arcade. In addition, whereas the Tasmanians, like the Murrayians, show a genetic tendency for the rare appearance of fourth molars, this trait is not found among the Barrineans. The last peoples, like the Andamanese, show a tendency for the late eruption, impaction or non-eruption of the third molars.

In the sum total of the features discussed, it seems clear that the Barrinean tribes of the Queensland rain-forest are more closely affiliated with the Andamanese than are the extinct Tasmanians. This inference is reached despite the importance of hair form and head breadth in conventional anthropological racial analysis.

With regard to hair form, the Tasmanians seem no more negritic for this trait than many peoples of Melanesia (Turner, 1914), and they have deviated appreciably from the Andamanese norm which we assume to represent the pure negritic form. The anomalous position of the Barrinean peoples in terms of cranial length-breadth index may have considerable significance. While the Andamanese and the more mixed Aeta of the Philippines and the Semang of the Malay Peninsula show a fairly consistent tendency toward high mesocephalic and low bracycephalic cranial indices, it should be remembered that these three small and isolated populations do not necessarily represent all the variations of cranial types present in the original widespread population of the Oceanic Negrito. It is possible, and the evidence of the Barrineans, together with suggestive data from New Guinea, implies that at least some of the Oceanic Negritos may well have been characterised by dolichocephalic cranial proportions. This speculative hypothesis will be elaborated at a later date in another paper.

The name Murrayian has been adopted for the second wave of migrants to Australia because of the concentration of this racial element in its least mixed form in the Murray River drainage basin and the contiguous marginal coastal regions to the south and east. This population is basically an Archaic White or Caucasoid group which in the light of present evidence seems to have reached Australia some time during the mid-portion of the Fourth or Last Glacial Period. This dating must remain tentative until the Pleistocene chronology for the entire region has been more rigorously defined. The Murrayian element may be traced archaeologically by the Keilor cranium from Victoria (Adam, 1943; Mahoney, 1943a, 1943b; and Wunderly, 1943), which is a classic representative; probably by the Aitape frontal fragment from the north coast of New Guinea (Fenner, 1941); by Wadjak I and II from Java (Dubois, 1920); and it is represented as an important element in the mixed *Homo sapiens* population from the Upper Cave at Choukoutien in North China (Weidenreich, 1939). The published datings of these four cranial finds range from Third Interglacial in the case of Keilor to possibly Mesolithic or Early Recent in the cases of Wadjak and the Choukoutien series. The first of these seems optimistically early in the light of De Terra's dating (1943) of *Homo soloensis* in Java.⁽²⁾ The two latter cases need not, and probably do not, represent the earliest appearance of the Murrayian race in Java and North China.

The living Murrayians may be characterized physically as short in stature, relatively lateral in general body build and with a significant tendency toward obesity. Their unexposed skin is relatively light coloured. Their hair form ranges from wavy to straight, baldness shows an unusually high incidence, and both body and facial hair are excessive. The head is both absolutely and relatively very low and long, and consequently the length-breadth, length-height and height-breadth indices are correspondingly low. Brow ridges are large, but not so extreme as generally claimed. Nasion depression is characteristically deep, but in some individuals this development is not extreme. The upper face is of moderate breadth and height, but the mandible is relatively shallow. The nose is uniquely characterized both by great breadth and high relief. Ears are very long and wide and the lobe is characteristically large. Teeth are very large, but prognathism is not so marked in the living as might be expected in association with this trait. In general, facial features are coarse and rough-hewn, but definitely Caucasoid in configuration.

(2) A recent examination of the site has produced evidence suggesting that the Keilor horizon may have been occupied in a stage of the Fourth Glacial Period rather than the Third.

This population shows its closest affinities among living peoples with the Ainu of Hokkaido and Sakhalin. In more extended terms, it is unquestionably related to some of the Upper Palaeolithic types of Europe. The basic pattern of early distribution seems to have been temperate to sub-boreal, and it may be inferred that in the late Pleistocene there in effect extended a broad gene pool of primitive Whites from Europe across the whole of northern Asia to the Pacific Ocean.

The third and last major racial element to enter Australia has been named the Carpentarian because of the position of the nuclear population around the shores of that Gulf. The distribution of this group at the time of White contact suggests that the present pattern could result only from a migration dated prior to the subsidence of the Sahul Shelf. In these terms it may be provisionally dated as having occurred late in the Fourth or Last Glacial Period. There have been found as yet no archaeological remains attributable to this population, and hence useful for dating purposes.

The Carpentarians are tall in stature and notably linear in body build. Their unexposed skin colour is very dark and this combined with the former features has unjustifiably suggested a genetical relationship with the full sized Negroes of Africa. Present evidence indicates that no such affiliation exists. Hair form is wavy to straight and both the body and face are glabrous. There is but little tendency toward baldness. Head proportions are characterized by moderate absolute length and height combined with extreme narrowness. As a consequence of the last trait the breadth-height index and the cephalo-facial index are extremely high. Brow ridges are large and nasion depression is deep. The face is moderate in absolute breadth, but wide relative to its low height and as compared with cranial breadth. The teeth are large, prognathism is marked and the shallow mandible is characterized by an ill-developed chin. The ear is characteristically moderate to small in size, but not notably negroid in its morphology. The nose is both short and low in relief. Nasal breadth is absolutely and relatively great. The general appearance of the Carpentarians is extremely primitive, generalized and non-White. They represent a fourth major racial group equivalent in status with the White, Mongoloid and Negroid groups.

The Carpentarian element represents the so-called "Australoid" type which has largely been described in the previous literature on the aborigines of Australia. Its closest affiliations are with the Veddoid or Pre-Dravidian elements in the population of India. Although the Carpentarians are absolutely much larger and morphologically more primitive than any of the existing peoples of India who might be adduced for comparison, they may be considered to be fairly representative of the late Pleistocene inhabitants of that peninsula and to have contributed the linear, dark-skinned element so prevalent in the population of central and south India. To-day the much-mixed dark-skinned peoples of India and the less-mixed aborigines of northern Australia are the only populations identifiably representative of this fourth major racial group, the Carpentarians.

In summary, the aboriginal population of Australia can be explained in terms of three successive migratory waves of Negritos, Murrayians and Carpentarians, all of which are to be derived from the mainland of Asia in the Fourth or Last Glacial Period of the Pleistocene.

Since the inhabitants of Melanesia have frequently figured in the theories concerning the origin of the Tasmanians, it will be profitable to re-analyze these populations in terms of this new Australian data. Most of the available materials for these regions are incomplete and in one way or another unsatisfactory in

terms of the racial problems posed. In addition, the populations of the area vary in such a heterogeneous fashion that the region has been intractable to the usual methods of anthropometric analysis. It is therefore not surprising that no definitive and clear-cut schema has been established for the human migrations into this region.

With the peopling of Australia falling within the Fourth or Last Glacial Period, the emergent Sahul Shelf requires that New Guinea and Australia be treated as a single regional unit. Without attempting in this paper to review the reconstructions as published in the literature, it may be noted that a confused terminology exists. Basic racial elements have been labelled as Negro, Negroid, Australoid, Papuan, Melanesian, Papuo-Melanesian, Paleo-Melanesian, Neo-Melanesian and the like. Some of these terms are extensions from distant areas, while yet others are primarily of linguistic rather than racial connotation. If the principle of the trihybrid origin of the Australian aborigines be extended to the area to the north, the major outlines of the problem take on new significance.

In terms of the evidence from Australia, there can be little doubt that the Asiatic Negritos represent the first *Homo sapiens* racial group to reach the continental land mass to the east of Wallace's Line. The fact that the populations of New Guinea and Melanesia are admittedly predominantly negritic in genetic composition, whereas in Australia this element is present only in the marginal areas, and there only in much diluted form, has always posed an anthropological paradox. Some writers (Howells, 1943) have attempted to resolve this difficulty by postulating that the so-called 'Australoids' represent the earliest immigrants, and that in New Guinea they preceded the Negritos. Others have suggested for some reason that the 'Australoids' entirely by-passed New Guinea and that the Negritos never reached the southern continent. In either case there always remained the issue of the origin of the Tasmanians to plague the author. Some, like Wood Jones (1934), invoked a long sea voyage from New Caledonia to fit this intractable issue into the general picture.

All of these difficulties may be smoothed out if New Guinea and Australia, joined by the Sahul Shelf, are treated as a single regional unit and ecological factors are introduced into the analysis. Cultural and physical adaptation to life in the tropical rain-forest must be considered as important determinants in any solution. The Negritos of Africa and Oceania are both limited in distribution to such areas of tropical rain-forests. Culturally, this is a difficult environment in which to attain a successful adaptation. In biological terms, such regions may be presumed to present special forms of genetical selection. There can be little question, from the evidence in Australia, that the negritic populations showed a higher survival rate in the Cairns tableland rain-forest than elsewhere on the continent. Both culturally and genetically they were there able to resist more successfully encroachment by alien peoples carrying cultures adapted to grassland regions.

When, during the Fourth Glacial Period, Australia and New Guinea were a single land mass connected widely by the Sahul Shelf, the incoming Negrito migrants could and did populate both regions. In the rain-forest the diminutive negroids were more perfectly adapted to that environment than were other and later hunting and collecting peoples. In the grassland they no doubt attained a reasonable adaptation in so far as they were not exposed to competition from other human groups. With the advent of a second migrant wave, the Murrayians, whose north temperate Asiatic region of origin suggests a grassland culture, competitive human groups appeared. In New Guinea and the limited rain-forested

area of Australia, the Negritos possessed adaptive advantages over these Archaic Whites, and there remained relatively intact. In the open grassland and parklands to the south, the Murrayians replaced the Negritos as a dominant human population. Whether the process involved differential population densities, cultural competition or slow extermination need not be specified. The Murrayian population absorbed the Negritos in the open regions of Australia with no more than a modest amount of effective hybridization. The special case presented by the Tasmanians will be discussed in greater detail later in this paper, but it should be noted that in terms of the trihybrid origin of the Australians they can be considered only as a dihybrid group consisting of a negritic substratum to which there has been added a preponderant element of Murrayian.

In New Guinea, which geographically was as accessible to the Murrayians as Australia, the Negritos remained the dominant population and absorbed a small but detectable minority of Murrayian genes. In the author's opinion, the rain-forest as an ecological factor provides the only satisfactory explanation for these important and evident differences in the present populations of the two regions. The advent of the third, or Carpentarian, wave of immigrants before the submergence of the Sahul Shelf did not alter the ecological balance between the Negrito and the non-Negrito populations. The Carpentarians mixed with and tended to replace the Murrayians in the non-forest regions of Australia. In New Guinea, the Carpentarians added another racial dimension to the basic population, but the genetic matrix of the rain-forest peoples everywhere remained negritic, and the racial impact was restricted to adulteration rather than replacement.

This reconstruction of the basic racial elements of the populations in New Guinea, and by extension the Melanesian islands to the eastward, is hypothesized from the more readily demonstrable sequence of events in the continent to the south. It is complicated by a pair of related factors of more recent origin. Some few millenia ago, perhaps no less than three nor no more than five, the trihybrid hunting and collecting populations of New Guinea and Melanesia were violently churned by the arrival of a Neolithic agricultural economy and the first penetration of migrant Mongoloids. It is not yet certain, but it appears probable that these two events were linked and that in at least some portions of the region Mongoloids were the actual cultural carriers of agriculture. In much of the interior of New Guinea, however, the new economy seems to have spread by diffusion. The importance of agriculture lies in the fact that previously inhospitable portions of New Guinea were now open to settlement by horticulturalists. Thus the high plateaus of the Great Central Range may be presumed to have become available for effective human occupancy for the first time. The present population densities of the whole region date from the replacement of hunting and collecting techniques by agriculture. The impact on the original populations can hardly be accurately estimated, but its effects were certainly of major magnitude and of great significance in creating the present heterogeneity of peoples in the area.

Metrical analysis of New Guinea populations is both discouraging and unfruitful. Some approach to a racial schema is possible, however, if a few 'marker traits' of morphological nature are pursued through the series available in the literature. These traits unfortunately do not represent identifiable single factor genes, but the *methodology does approximate in a very rudimentary way the analysis of gene frequencies in populations, as opposed to the current procedures either of basing the analysis upon the combination of traits within the individual as a unit or making cross-population comparisons in terms of primarily indicial and secondarily metrical means.* The details of this analysis will not be elaborated here, but

the inferences tend to substantiate the hypotheses of the above paragraphs. In the interior highland plateaus of New Guinea and in the interiors of such larger Melanesian islands as New Britain and New Caledonia the populations are quite clearly dihybrid, consisting of a predominant negritic element to which has been added a minority of Murrayian genes. In the lowland and coastal regions of New Guinea there is generally evidence of a third element, the Carpentarian, having been infused to produce a trihybrid population. These same three racial elements, of course, are present in certain limited regions in Australia but there Carpentarian and Murrayian genes are predominant, whereas everywhere in New Guinea the negritic genes form the basic genetic matrix of the mixed populations. Finally, in most of the Melanesian speaking coastal areas there are indications of the addition of diluted Mongoloid racial elements. These last regions are the most complicated, and in terms of the four major racial elements involved such populations must be considered as quadrihybrid in origin.

In terms of this analysis certain inferences follow. Aside from the contribution made by the Oceanic Negrito, there is no negroid element for all of Australasia. The full sized African Negro has been present neither in this region nor in Asia. Hence, it seems advisable to relabel the so-called Oceanic Negroids as Oceanic Negritoids. As a second conclusion, it may be inferred that the Oceanic Negritoids, the so-called Melanesian and Papuan racial types, did not migrate as such from Asia, but were formed *in situ* in the island chains through the processes of hybridization, to produce new racial populations. There has been a tendency among anthropologists to view existing populations in static terms. In general, authors have conceived of the various present populations of Melanesia, New Guinea, Australia and Tasmania as entities which remained intact during migrations covering millennia and ranging over thousands of miles. This attitude has characterized most writers who have concerned themselves with the problem of the origin of the Tasmanians. *It is a more profitable point of view to consider existing populations as merely transient by-products of the complicated processes of racial dynamics, a field in which hybridization seems nearly always to have played an important role.*

Before proceeding with a brief analysis of the physical characteristics of the Tasmanians, a few comments of orientation on the most important recent work in this field, that of Wunderly, are in order. Wunderly's work is a lineal descendent of the pioneer studies of Turner. The latter's definitive description of the Tasmanian crania was based upon a personal examination of only ten skulls; eight males, one female, and one juvenile. Turner's descriptions are thus based on a very small sample. Wunderly not only accepted these without qualification, in terms of the sampling error inherent in such data, but proceeded further to utilize Turner's descriptions for the establishment of a rigorous, morphological definition for the Tasmanian race. In requires but little statistical knowledge to comprehend that the total range of variation of a statistical universe, in this case the Tasmanian population, can not be predicted in any sense from a sample of eight individuals. With the enlarged series available for his examination, many crania fell outside of Turner's specified morphological limits. Such examples, Wunderly concluded, must belong to hybrids or in some other category which falls outside of the population of full-blooded Tasmanian aboriginals.

It is instructive to examine Wunderly's treatment of his Tasman series. His original total of 114 examples can be reduced to 101 by the excluding of 13 specimens, 'lost or too fragmentary to yield reliable data'. Now, it seems very reasonable to expect a small number of these crania to be rejected as non-aboriginal as a result of their non-scientific collection by untrained individuals. Wunderly, however, concludes that 33 per cent of this series of 101 crania do not represent full-blooded

Tasmanian aboriginals. His breakdown is of some interest. Three crania, that is about three per cent, are classed as non-aboriginal in the sense that they contain no visible evidence of either Tasmanian or Australian aboriginal origin. This is certainly a reasonable conclusion and this frequency does not run ahead of expectation. Had Wunderly stopped here, the norms of the Tasmanian population would have suffered no curtailment of their true morphological and metrical ranges. He proceeded further to exclude from his full-blooded Tasmanians an additional 30 per cent of the total 101 crania available. The excluded categories comprise the following: (a) Australian full-blooded aborigines (12); (b) Tasmanian-Australian hybrids (9); (c) Tasmanian-European hybrids (7); (d) Australian-European hybrids (3). It is presumably significant in terms of his selective criteria that nine of the ten crania included in the Tasmanian-European hybrids and the Australian-European hybrids were sexed as females. Having examined numerous living representatives of three of these categories, I can say that Wunderly's identification of these four classes of crania is unjustifiable. It is this author's opinion that the Wunderly series of Tasmanian crania have been deprived, at a conservative estimate, of twenty-five or more skulls which represent the most interesting, and in many ways the most revealing, variants of the unmixed Tasmanian aboriginal population.

In an earlier portion of this paper the author's conclusions were anticipated in the statement that the Tasmanians represented a dihybrid race, representing a mixture of Oceanic Negritos and Murrayians. This inference follows from a comparison of the Tasmanians with the various populations which might conceivably have contributed to their unique combination of characteristics. By utilizing the scanty descriptive data available for the living Tasmanians and the more important craniometric information available, the affinities of this group are clearly closer to the population of south-eastern Australia than to the Negritos of the Andaman Islands. In the following abridged list of morphological and metrical traits the Tasmanians stand much closer to the norms of the Murrayian populations than they do those of the Andamanese. These metrical characteristics include stature, and by inference weight, with some suggestive descriptive material indicating a tendency toward stoutness or even obesity among the living Tasmanians. Cranial features which show a closer relationship to the Murrayians include the relatively long and narrow vault characterized by low height. In morphological terms, the cranium is characterized by the relative rugosity of the muscular attachments, a marked tendency toward thickness of the bones of the vault and the rounded contours of the nasal aperture, orbital cavity and foramen magnum. There is a marked tendency toward the keeling of the vault sagittally. The massive brow ridges, glabella and deep nasion depression only can be attributed to Murrayian ancestors. Facial lengths and breadths, including the bigonial diameter, are much closer to these Archaic Whites than to the diminutive Negroids. The general mandibular architecture, especially in the more robust males, is distinctly reminiscent of the unique combination of features found in the Murrayians. General tooth size and palatal dimensions deviate far from the Andamanese in the direction of the macrodont southern Australians. Both descriptive and photographic evidence based on the living, shows that the Tasmanians were characterized by sufficient beard and body hair strongly to imply a Murrayian ancestry. The characteristic ear form of the former group, including a very large lobe as well as great length and breadth, only can be derived from these mainland Australians. In addition to the above traits there are a few uncommon characteristics which link the Tasmanians with the Murrayians. The rarity of these traits is com-

pensated for to some extent by their presumably simple genetic mode of transmission. I am referring specifically to the occasional occurrence of fourth molar teeth in both races and to the somewhat more common presence of a special form of auditory exostosis which has been identified in both groups. Possibly fitting into the same category is the sporadic occurrence of a moderately developed mandibular torus (Fenner, 1939a).

One can only agree with Hrdlicka (1928) that the similarities between Tasmanian and Australian crania, more specifically of the Murrayian type, are so great that a close relationship must necessarily be inferred. Hooton's (1931) conclusion that the extinct Tasmanians represent a dihybrid group consisting of a mixture between the Oceanic Negritic race and the southern type of Australian is also confirmed. The positions taken by these two authorities are not identical, but they can be reconciled with a little further elaboration. The author agrees that the Tasmanians do, in fact, represent the kind of dihybrid suggested by Hooton, but modifies that statement by varying the amount attributed to the parental racial types. In my opinion the Tasmanians represent a dihybrid race whose predominant genetic element is not Negrito, but on the contrary represents the Murrayian Australian type from the south-eastern portion of that continent. The Oceanic Negritic element is clearly present but its importance has been over-emphasized by previous authors. A comparison with the Andamanese indicates that the negritic element in the Tasmanians must have been the minority contribution.

In evaluating the racial position of the Tasmanians it should be noted that there exist other populations in Australasia which show a roughly comparable type of genetic makeup. Four such populations are worth particular note. In Australia the Barrinean tribes show the same general genetic constitution, but among these peoples the negritic element appears to be greater than among the Tasmanians. In New Guinea the high plateaus of the interior appear to be peopled by populations basically negritic in origin and modified by an obvious Murrayian element. Such groups include the Tapiro, the tribes of the Goliath Mountains and the Timorini and related peoples of Netherlands New Guinea. In the eastern portion of that great island reliance must be placed upon photographic evidence rather than detailed metrical and morphological descriptions. It seems clear, however, that this portion of the interior plateau is also peopled by natives of similar genetic composition. All these tribes of interior New Guinea deviate from the Tasmanians and the Barrineans in that here the negritic element seems clearly to be the preponderant one and the Murrayian element secondary in importance. Continuing out into the islands of Melanesia proper, attention can next be focused upon the interior inhabitants of the Gazelle Peninsula. These people, particularly in the region of the Varzimberg Mountains, are again clearly dihybrid. Genetically the negritic element still remains predominant, but the Murrayian contribution has increased as compared to the plateau peoples of New Guinea. Finally, at the end of the Melanesian archipelago, a bloc of tribes in the interior of northern New Caledonia merit passing attention. In the region around Pamboa both cranial remains and data on the living reveal a dihybrid population which more closely approximates the extinct Tasmanians than any of the preceding groups. In the Pamboan population the negritic element has fallen to a minority status and the total morphology of these people is clearly Murrayian. Like the Tasmanians, hair form remains spirally curled and impressively negritoid, but the total morphology demonstrates beyond doubt that here, as among the Tasmanians, hair form can be importantly misleading in the analysis of racial affiliation. Hair form

in genetic terms is probably an expression of multiple factors, each of which may include multiple allelomorphs. Traits of this sort are invaluable as markers for the presence of negritic or negroid admixture; however, it can not be safely inferred that all such peoples are characterized by a genetical preponderance of these elements. A comparison between the populations listed above would reveal differences as well as basic similarities. These differences are attributable to a number of causes. Perhaps primary as a contributing factor would be the variable proportions in which the two parental races contributing to the mixture are genetically present. Secondly, it must be remembered that these groups are essentially small populations, in Sewall Wright's sense of the phrase, and are hence subject to the interesting but unpredictable and as yet little understood process known as random genetic drift. Physical anthropology is clearly in need of more genetical techniques and much more field work utilizing genetical approaches to clarify this and other admittedly complicated problems.

At the present time a genetical analysis of race is necessarily limited to utilizing the O, A, B blood groups, the M, N, blood types, and the Rh series. These three sets of genes are alone sufficiently known in their mode of inheritance. allelic dominance, penetrance and expressivity to be quantitative tools for racial analysis. Although time does not permit detailed reference to his work, Roy T. Simmons of the Commonwealth Serum laboratories should be singled out for special commendation with regard to his important and substantial contributions to our knowledge in these fields as the result of his investigations throughout all of Australasia and even into Indonesia. These important results may be summed up here with the statement that his findings tend to fit into and substantiate the racial analysis presented by the author for the peopling of Australia and Melanesia. The blood groups and blood types of the hybrid descendents from seven aboriginal Tasmanian women (Birdsell and Boyd, 1940) show that reconstructed values for the latter in general accord with those of the Murrayians. This series is absurdly small and further data for the Tasmanians are needed. Since the O, A, B blood groups can be determined from the cancellous tissue of archaeological skeletons, without harming their value as specimens, it is somewhat surprising that those institutions and individuals fortunate enough to possess such Tasmanian remains have neither organized nor encouraged a project of such scientific value.

The applications of genetical concepts in racial analysis need not necessarily be limited even at this time to the serological genes. As an example, let us consider that trait of the extinct Tasmanians which has been considered by so many authorities to represent an exclusive trademark, the para-sagittal groove. Many Tasmanian crania characteristically show on either side of the sagittal keel and medial to the parietal bosses a trough-like or grooved configuration. There has been a marked tendency in the literature to accept this trait as being uniquely Tasmanian and to make no further inquiry as to its possible origin or the frequency of its distribution in other groups. Admittedly it has been noticed as an infrequent occurrence among the Murrayian crania of southern Australia. The author suggests that this trait, the para-sagittal groove, is a genetic consequence of the hybridization of markedly differing cranial types. It is hypothesized that the trait results when one parental type is characterized by a strongly marked sagittal keel and the other parental type shows a high frequency and marked development of the parietal bosses. If this assumption be true, then such mixtures may be presumed to have occurred in other regions of the world than Tasmania. Even in my limited personal experience this condition is fulfilled. For example, not only is the para-sagittal grooving present among Baining crania from New

Britain, but a cursory examination of the rest of Melanesia shows that this condition is in fact a common one. It may be further recorded as occurring with high frequency among the inhabitants of the channel islands of southern California, specifically Santa Catalina and Santa Cruz. While the occurrence of the trait in Melanesia might be interpreted by some anthropologists as indicating the presence of a Tasmanian race in these regions, this belief can hardly be maintained for the Mongoloid peoples of southern California. There is, however, evidence for the belief that in all of the groups mentioned above there has occurred in fact hybridization between a long-headed, strongly keeled cranial type and a shorter-headed cranial type characterized by a rather flat vault but marked parietal bosses. It may confidently be expected that when the mode of inheritance of sagittal keeling and parietal bosses has been thoroughly analyzed, it will be found that the trait called para-sagittal grooving will be identified as a genetic consequence of the hybridization of parental groups characterized by the former traits. The para-sagittal grooves can hardly be considered longer as a unique morphological development, limited to the Tasmanians.

In elaborating the movements of peoples which resulted in the trihybrid origin of the Australian aborigines, the problem of the actual peopling of Tasmania was held in abeyance. In the light of present data this problem can hardly be decisively settled. Certain alternative hypotheses, however, can be stated. The genetic evidence suggests that the somewhat aberrant distribution of parental racial traits found in the Tasmanian aboriginal might best be explained if that island had been peopled subsequent to the formation of Bass Strait as a water barrier after the end of the Fourth Glacial Period. Under such conditions it would seem probable that the migrants to Tasmania commenced at Wilson Promontory in Victoria and navigated the intervening water to the most northerly of the Furneaux group of islands. These conditions would make feasible the idea the Tasmanian aborigines sprang from a small group, comprising a few families who had been forced to migrate across Bass Strait within a relatively limited duration of time as a consequence of population pressures and possibly cultural clashes in the region of the Victorian coast. With this hypothesis, the sampling of the Victorian population to produce the original migrants to Tasmania need not represent a randomized distribution of racial traits, owing to its original small size. This factor, then, reinforced by random genetic drift, would amply explain the rather inharmonious mosaic of Negrito and Murrayian traits found among the extinct Tasmanians. It is somewhat regrettable that the geological and oceanographic data now available, limited though it is, suggest that this hypothesis for the original peopling of Tasmania is not entirely tenable.

Extant data seem to indicate clearly that a eustatic lowering of sea level sufficient to cause the emergence of the Sahul Shelf would necessarily create a broad land bridge between Tasmania and the Australian mainland. Since there are very good reasons for believing that all three of the major racial elements to enter Australia did so via the Sahul Shelf, it must be presumed that during this entire period of migration Tasmania represented a peninsular extension southward of the Australian mainland. Under such conditions Tasmania could represent no more a continental refuge area in the terms of our problem. This concept presents the obvious disadvantage that Tasmania could not have been peopled by a few families of migrants traversing a water gap. The original inhabitants of Tasmania must have represented a population similar to that present in many parts of continental Australia in earlier days. In terms of geological conditions it would be interesting to know, although there seem to be no supporting data

to-day on this point, whether during the Fourth Glacial Period southern Victoria and what is now Tasmania were to any degree more heavily forested than they are at the present time. If future evidence were to prove this true, a rough analogy might be drawn between the tropical rain-forests of North Queensland which provided a cultural refuge for the Barrinean peoples, and the temperate forests in the southern portion of the continent. For example, a relatively impassable floral aggregate, similar to the evergreen beech complex now persisting in the western mountains of Tasmania, might provide such an answer if its distribution were much more widespread during the Fourth Glacial Period. In any case, it is necessary to conclude that if Tasmania was populated during the Fourth Glacial Period, which seems most probable, then its earliest inhabitants must have been pure negritic in their racial affiliations. The aceretion of Murrayian genes which in time became predominant in the Tasmanian population, must have filtered in over a long period of time—a period perhaps corresponding to half the duration of the Fourth Glacial Period. In these terms the aboriginal remains from Eaglehawk Neck, while they may be somewhat earlier than most of the other known crania, are still relatively late in chronological terms. It need not be considered surprising that they are even less negritoid in their characteristics than the more modern aboriginal erania. The erania of the West Coast tribes, which Wunderly rejects as being representatives of either full-blooded Australian or Australian-Tasmanian hybrids, may be viewed in rather similar terms. In small breeding populations one does not expect genetical or morphological homogeneity throughout an area of this size. On the contrary, the operations of random genetic drift dictate that regional differences should occur. The fact that the West Coast tribes were somewhat isolated from the rest of the natives of the island tends to reinforce this view. These West Coast crania admittedly deviate somewhat more in the direction of Murrayian norms than do other Tasmanian erania, with the possible exception of those from Eaglehawk Neck. This should be viewed not as a proof of their 'unauthenticity' but merely as a normal expectation of the operation of genetical laws in a hybrid population whose parental components were Murrayian and negritic.

This paper has presented an hypothesis of the origin of the extinct Tasmanians which carries the implications of a re-orientation toward certain cultural problems in Tasmania and Australia. A few of these may be suggested without further elaboration as follows:—

1. The social organization and material culture of the Tasmanians at the time of discovery may be considered as representative of the Murrayian peoples prior to their modification by Carpentarian and subsequent influences. It is not essentially negritic in origin. In this view, Tasmanian culture preserved, through isolation by Bass Strait, the early Murrayian culture which on the mainland had tended to disappear as the result of the diffusion and invention of new cultural elements.
2. Many cultural traits which have been considered uniquely Australian are post-Murrayian in origin, and either represent items introduced by the Carpentarians or traits invented in Australia after the arrival of the latter group.
3. The series of legends dramatized by Matthew in his *Eagle Hawk and Crow* may in fact have a historical basis in diffused inter-racial contacts.
4. The dingo was introduced to Australia by the Carpentarians and originated as a domesticated version of the Indian wolf, which later became feral in the southern continent.

CONCLUSIONS

1. The Australian aborigines are of trihybrid origin and not a single homogeneous pure race as previously maintained by numerous authors.

2. The aboriginal population of Australia has been formed by a mixture of Negritos, Murrayians and Carpentarians. All of these elements can be traced back to the mainland of Asia. On the basis of available data, all three racial groups entered Australia during the Fourth Glacial Period when the Sahul Shelf joined New Guinea to Australia.

3. The aboriginal inhabitants of New Guinea and Melanesia contain the same racial ingredients as the trihybrid Australians, with small additions of Mongoloid genes present in some areas. In contrast to Australia, these populations are basically negritic in their genetical composition as a result of the rain-forest environment of this area. The Mongoloid element is a recent addition dating from the introduction of an agricultural economy into Melanesia, an event which profoundly affected population densities and environments and resulted in the present heterogeneity of groups in these islands.

4. The extinct Tasmanians represent a dihybrid population consisting of negritic and Murrayian elements, with the latter preponderant. Populations similar in nature, although varying somewhat in proportions, may be found among other places in the rain-forest tablelands of North Queensland, in the Central high plateaus of New Guinea, in the interior of the Gazelle Peninsula of New Britain and in the northern interior of New Caledonia.

5. It is predicted that archaeological discoveries in the future will show that if Tasmania was inhabited prior to its separation from the mainland of Australia, the earliest inhabitants will prove to be pure negritic in type. In any case, unmixed Negritos will be found archaeologically to represent the earliest forms of *Homo sapiens* to be found on the mainland of Australia.

6. Wunderly's analysis of his Tasman series is conceptually unjustifiable, and has resulted in an artificial restriction of the metrical and morphological variations inherent in the Tasmanian aboriginal population. The West Coast Tasmanian crania are not the result of a late prehistoric invasion of Australians from the mainland, but a natural consequence of the operations of random genetic drift in the small dihybrid Tasmanian population.

7. This analysis of the racial affinities of the extinct Tasmanians and the Australians suggests that a re-orientation and re-analysis of the cultures of these two groups would be an anthropologically profitable venture.

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